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10/672,013	09/26/2003	Seong Deok Ahn	2013P107	7684

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EXAMINER

BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 12/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/672,013

Applicant(s)

AHN ET AL

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6 and 8-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4 and 6 and 8-12 are rejected under 35 U.S.C. 103(a) as obvious over Jurgensen I (WO 01/61071) taken in view of Jurgensen II (WO 02/27064) and/or Gartner (4,947,790).

Jurgensen I (WO 01/61071) and Jurgensen (US 2003/0054099) are patent family equivalents and Jurgensen (US 2003/0054099) is used in this office action as an English translation for Jurgensen I (WO 01/61071). Jurgensen II (WO 02/27064) and Jurgensen (US 2003/0192471) are patent family equivalents and Jurgensen (US 2003/0192471) is used in this office action as an English translation for Jurgensen II (WO 02/27064).

Jurgensen I (see Figs. 1-6) discloses an apparatus for vapor phase deposition including process chamber, temperature controlled substrate holder, showerhead, source chambers for generating organic source vapors, transfer gas (i.e. carrier gas) source and a source heater for evaporating source material in the source chamber. Regarding claim 3, Jurgensen I (see Fig. 8) and Jurgensen II (see Figs. 2 and 3) both teach the use of a vaporizer having the transfer gas line extending into the source chamber. Regarding the purging step in claim 11, Jurgensen teaches (paragraphs 44 and 45) the step of providing a further feed line to feed carrier gas to the showerhead to purge the showerhead plenum when switching precursor streams. Also, Jurgensen's

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three-way valve 43 of Fig. 8 automatically switches carrier gas into the chamber supply line 6 when source gas flow is terminated.

Regarding the claim 1 and claim 11 recitation of a conic block or conic plate transfer gas distributor, Jurgensen II teaches the use of a source chamber with a conic gas distributor plate to supply source gas to a vapor coating chamber. It is noted that the vaporizer of Jurgensen II is equivalent to that of DE 10048759 that is cited in paragraph 47 of Jurgensen I. In the source chamber of Fig. 4 of Jurgensen II, the apex of the conic plate is pointing towards the gas port 11, which Jurgensen describes as an outlet of the vessel 2 (see para. 18 of Jurgensen II). It is noted, however, that the port 11 is also an inlet to the pipe leading to the coating chamber, and transfer gas enters the port 11, and therefore port 11 is "a transfer gas inlet" as recited in claim 1, and the apex of the conic block or plate 16 is "pointing towards the transfer gas inlet" 11. It would have been obvious to use the vaporizer of Jurgensen II in the apparatus of Jurgensen I, because the vaporizer of Jurgensen II is equivalent to that of DE 10048759 that is cited in paragraph 47 of Jurgensen I. Also, Gartner (see Fig. 3) teaches a vaporizer for vaporizing organic source vapors that is analogous to the vaporizer of Jurgensen II. Gartner's Fig. 3 vaporizer includes a conic block or conic plate 10, with its apex pointing towards the transfer gas inlet 6. Gartner (see col. 9, lines 23-44) teaches that his Fig. 3 vaporizer has desirable characteristics such as eliminating the formation of large cavities in the organic precursor powder, and also providing a better efficiency and flow constant. It would have been obvious to one skilled in the art to use the organic precursor vaporizer of Fig. 3 of Gartner as the organic vapor source in the

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apparatus of Jurgensen I in order to gain the desirable benefits of better efficiency and flow constant as taught by Gartner.

Regarding the newly recited "diluted gas supply source" of claim 1, it is noted that apparatus claim 1 fails to include any recited apparatus structure for connecting the recited diluted gas supply source to the other recited parts of the apparatus. The phrase "from which diluted gas is supplied to combine with the transfer gas before entering the process chamber and after the transfer gas leaving the source chamber in order to control the process chamber" is a recitation of intended use of the recited diluted gas supply source. As such, this recitation of intended use does not so limit the apparatus of claim 1. Regarding the newly recited limitation of process claim 11, it is noted that Jurgensen I (see paragraphs 71 to 73 of US 2003/0054099) teaches that the tanks 1, 3 of Figs. 1 and 5 may be directly substituted for by the vaporizer of Fig. 8 or the vaporizer of DE 10048759.9 (which is the Jurgensen II vaporizer). The vaporizer of Fig. 8 of Jurgensen I includes a carrier gas (i.e. transfer gas) feed pipe 42 connected to the vaporizer, and a second carrier gas (i.e. diluting gas) feed pipe 35 which is connected to the vapor outlet pipe 6. Furthermore, Jurgensen I (see para. 73) clearly teaches that the carrier gas 35 is intended to dilute the vapor in line 6 in order to reduce the partial pressure of the vapor and thus reduce the temperature that is required to prevent condensation of vapor in line 6. It is noted that this teaching is also directly applicable to the solid source vaporizer of Jurgensen II (i.e. DE 10048759.9) or Gartner. Therefore, it would have been obvious to one skilled in the art to connect a diluting gas source of the type illustrated as 35 in Fig. 8 of Jurgensen I to the source vapor supply

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line 5 of Jurgensen II or the source vapor supply line 19 of Gartner, for the desirable purpose of reducing partial pressure of the source vapor in the source vapor supply line as taught by Jurgensen I. Also, the step of controlling the partial pressure downstream of the vaporizer as taught by Jurgensen I inherently meets the recited limitation of "to control pressure of the process chamber".

Claim 2 is rejected under 35 U.S.C. 103(a) as obvious over Jurgensen I (WO 01/61071) taken in view of Jurgensen II (WO 02/27064) and/or Gartner (4,947,790) for the reasons stated in the rejection of claim 1 above, and taken in further view of Ohashi (6,059,885) (see Figs. 2-10, and col. 14, lines 59-60, for example) or Nguyen (6,444,039) (see Figs. 2 and 6 and col. 2, lines 8-15, for example), each of whom teaches the use of a shower curtain installed between a shower head and a substrate holder in a vapor deposition apparatus, wherein the shower curtain surrounds the substrate holder to improve the gas flow or protect the process chamber walls, and for those reasons it would have been obvious to use such a shower curtain in the vapor deposition apparatus of Jurgensen I. Baek (5,670,218), cited by Nguyen, is cited of interest.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen I (WO 01/61071) taken in view of Jurgensen II (WO 02/27064) and/or Gartner (4,947,790) for the reasons stated in the rejection of claim 1 above, and taken in further view of Ozias (4,846,102) (col. 2, lines 15-21) who teaches that vapor coating reactors are typically flushed after a coating process. It would have been obvious to

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one skilled in the art to purge after deposition in Jurgensen's coating apparatus for the desirable purpose of flushing unwanted gases from the reaction chamber.

Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen I (WO 01/61071) taken in view of Jurgensen II (WO 02/27064) and/or Gartner (4,947,790) for the reasons stated in the rejection of claim 1 above, and taken in view of Forrest I (5,554,220), Forrest II (6,337,102) and Posa (4,747,367). Forrest I (col. 7, lines 60-67) and Forrest II (col. 3, lines 48-61) teach that it is desirable to switch the gas flows in an OVPD process for depositing plural separate layers, and for that reason it would have been obvious to do so in Jurgensen's OVPD reactor.

Furthermore, Posa teaches that a vapor coating reactor that is used for depositing plural separate layers should be flushed at the end of each separate gas flow. In view of Posa, it would have been obvious to purge Jurgensen's chamber after the end of each separate gas flow.

Applicants' arguments have been considered but are not persuasive.

In both of Jurgensen II (WO 02/27064) and Gartner, the carrier gas is distributed widely along an outer surface of the conic plate. Regarding conic plate 16 of Fig. 4 of Jurgensen II, the bottom of plate 16 is the outer surface of the conic plate 16 because it faces away from the interior of the vaporizer where the material to be vaporized is held.

Regarding the use of dilution gas, see paragraph 73 of Jurgensen I (WO 01/61071 or 2003/0054099).

Applicants have argued that Gartner does not explicitly disclose that the powder saturator has a conic shape. It is noted, however, that Gartner's Fig. 3 illustrates that

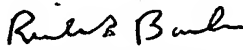
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the porous plate 10 has the cross-section of a conic plate. Also, Gartner states at col. 9, lines 37-44 that the wall 32 is annular, which makes clear that the vaporizer is round, and thus the plate 10 is conic.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Richard Bueker
Primary Examiner
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